



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/706,395	11/12/2003	Yucel Altunbasak	062020-1310	6853
24504 7590 04/02/2007 THOMAS, KAYDEN, HORSTEMEYER & RISLEY, LLP 100 GALLERIA PARKWAY, NW STE 1750 ATLANTA, GA 30339-5948			EXAMINER DIEP, NHON THANH	
			ART UNIT 2621	PAPER NUMBER
SHORTENED STATUTORY PERIOD OF RESPONSE		MAIL DATE	DELIVERY MODE	
3 MONTHS		04/02/2007	PAPER	

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No. 10/706,395	Applicant(s) ALTUNBASAK ET AL.	
	Examiner Nhon T. Diep	Art Unit 2621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS; WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on Interview summary of 3/27/2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) 12-23 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input checked="" type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>6/2004, 11/2003</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-11 are rejected under 35 U.S.C. 102(b) as being anticipated by article titled "Low Complexity Rate-Distortion Optimal Macroblock Mode Selection And Motion Estimation For MPEG-Like Video Coders by Kim et al (cited in the IDS by the applicants).

Kim et al discloses a low complexity rate-distortion optimal macroblock mode selection comprising the same video system comprising:

a video processing circuit that receives a picture and provides video compression by using an optimal macroblock mode of operation (fig. 1), the optimal macroblock mode of operation being identified by processing at least one macroblock of the picture, the processing being performed independent of other macroblocks contained in the picture (page 3, coders utilize several modes of operation that are selected on a macroblock-by-macroblock basis and select the mode with the lowest residual energy) as specified in claim 1; wherein the video processing circuit includes an encoder (fig. 1), the encoder comprising: a motion estimation circuit (motion estimation) that identifies an optimal motion vector by processing at least one macroblock contained in the picture, wherein the processing is carried out independent of other macroblocks contained in the

Art Unit: 2621

picture (motion estimation module produces both motion vector and prediction residual for each macroblock); and a mode selection circuit that identifies the optimal macroblock mode of operation (Mode selection) as specified in claim 2; wherein the mode selection circuit identifies the optimal macroblock mode of operation by using a rate-distortion model, where the rate-distortion model comprises an overall macroblock mode distortion D that is defined by a model equation $D = D_{ac} + D_{dc}$, wherein D_{ac} is a distortion due to AC coefficients and D_{dc} is a distortion due to DC coefficients (equation 13) as specified in claim 3; where D_{ac} is a model equation that is defined by $D_{ac} = k_1 f(\delta) g(R_{ac})$, wherein $f(\delta)$ and $g(R_{ac})$ are two functions, δ is a measure of deviation of AC coefficients, R_{ac} is an allocated rate for encoding AC coefficients, and k_1 is a first numerical parameter that comprises at least one of a fixed number, an estimated number, and a number that is dynamically determined during a frame of the picture (equation 14) as specified in claim 4; when $f(\delta) = \delta^{k_2}$, wherein k_2 is a second numerical parameter that comprises at least one of a fixed number, an estimated number, and a number that is dynamically determined during a frame of the picture (equation 14) as specified in claim 5; when $g(R_{ac}) = e^{-k_3 R_{ac}}$, where k_3 is a third numerical parameter that comprises at least one of a fixed number, an estimated number, and a number that is dynamically determined during a frame of the picture (equation 14) as specified in claim 6; when R_{ac} is defined as $R_{ac} = R_{total} - R_{hdr} - R_{mv} - R_{dc}$, wherein R_{total} is a target total number of bits for the at least one macroblock, R_{hdr} is a rate of encoding a header of the at least one macroblock, R_{mv} is a rate of motion vectors, and R_{dc} is a rate of the DC coefficients (equation 15) as specified in claim 7; wherein D_{dc} is

Art Unit: 2621

calculated using a mean intensity value over the at least one macroblock, and a quantization is carried out using a fixed step size (Intra type macroblock and page 12, lines 15-18) as specified in claim 8; wherein Ddc is equal to zero (last line, page 12) as specified in claim 9; wherein the optimal macroblock mode of operation is selected as one that minimizes the overall macroblock mode distortion D (page 14, fig. 3, "choose minimum distortion") as specified in claim 10; wherein the signal received from the video signal source is at least one of a JPEG signal, an MPEG-x signal, and an ITU-specified H.26x 3 signal (page 2) as specified in claim 11.

3. Claims 1-3, 8-11 are rejected under 35 U.S.C. 102(b) as being anticipated by Sethuraman (US 6,037,987).

Sethuraman discloses an apparatus and method for selecting a rate and distortion based coding mode for a coding system comprising the same video processing circuit that receives a picture and provides video compression by using an optimal macroblock mode of operation (fig. 1), the optimal macroblock mode of operation being identified by processing at least one macroblock of the picture, the processing being performed independent of other macroblocks contained in the picture (fig. 2, el. 205) as specified in claim 1; wherein the video processing circuit includes an encoder (fig. 1), the encoder comprising: a motion estimation circuit (fig. 1, el. 140) that identifies an optimal motion vector by processing at least one macroblock contained in the picture, wherein the processing is carried out independent of other macroblocks contained in the picture; and a mode selection circuit that identifies the optimal macroblock mode of operation (fig. 2, el. 218) as specified in claim 2; and wherein the

signal received from the video signal source is at least one of a JPEG signal, an MPEG-x signal, and an ITU-specified H.26x 3 signal (col. 1, ln. 13-25) as specified in claim 11.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 3 and 8-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sethuraman, in view of Kim et al.

As applied to claim 2 above, it is noted that further disclose the optimal macroblock mode of operation is selected as one that minimizes the overall macroblock mode distortion D (fig. 2, el. 218) as specified in claim 10. However, Sethuraman does not particularly disclose wherein the mode selection circuit identifies the optimal macroblock mode of operation by using a rate-distortion model, where the rate-distortion model comprises an overall macroblock mode distortion D that is defined by a model equation $D = D_{ac} + D_{dc}$, wherein D_{ac} is a distortion due to AC coefficients and D_{dc} is a distortion due to DC coefficients as specified in claim 3; wherein D_{dc} is calculated using a mean intensity value over the at least one macroblock, and a quantization is carried out using a fixed step size as specified in claim 8; wherein D_{dc} is equal to zero as specified in claim 9. Kim et al teaches that "in general, the overall coding distortion of a macroblock is composed of the distortions due to the quantization of the DC coefficient and the AC coefficients and wherein D_{dc} is calculated using a

Art Unit: 2621

mean intensity value over the at least one macroblock, and a quantization is carried out using a fixed step size (Intra type macroblock and page 12, lines 15-18) as specified in claim 8; wherein Ddc is equal to zero (last line, page 12) as specified in claim 9. And therefore, it would have been obvious to one of ordinary skilled in the art at the time the invention was made to modify the system of Sethuraman by calculating the total distortion of both AC and DC coefficients. Doing so would help to select a better mode for coding macroblocks.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- a. Legall et al (US 5,929,916) discloses a variable bit rate encoding.
- b. Keller et al (US 7,023,924) discloses a method of pausing an MPEG coded video stream.
- c. Zhao et al (US 2003/0067981 A1) discloses systems and methods for performing bit rate allocation for a video data stream.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nhon T. Diep whose telephone number is 571-272-7328. The examiner can normally be reached on m-f.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mehrdad Dastouri can be reached on 571-272-7418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

ND
3/28/2007

A handwritten signature in black ink, appearing to read 'Nhon Diep', with a long horizontal flourish extending to the right.

NHON DIEP
PRIMARY EXAMINER